APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,389	01/05/2001	Sanjeev Banerjia	10990960-1	5215

			EXAMINER
22879	7590	05/11/2004	FOWLKES, ANDRE R

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

ART UNIT	PAPER NUMBER
2122	7

DATE MAILED: 05/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _18 March 2004_.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-23_ is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) _1-23_ is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____.
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed on 03/18/2004.

2. The rejections to the drawings are withdrawn in view of applicants amendment.

3. Claim 23 is amended.

4. Claims 1-10, 12-20, 22 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Chilimbi et al. (Chilimbi), U.S. Patent No. 6,330,556.

5. Claims 11 and 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chilimbi et al. (Chilimbi), U.S. Patent No. 6,330,556 in view of Walls, U.S. Patent No. 5,675,790.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Prote____ of 1999 (AIPA) and the Intellectual Property and High Technology Tech_____ing Amendments Act of 2002 do not apply when the reference is a ____ 29, 2000. directly or indirectly from an international application file____ C. 102(e) prior

Therefore, the prior art date of the reference is d_____ to the amendment by the AIPA (pre-AIP_____

7.   Claims 1-10, 12-20, 22 and 23 rejected under 35 U.S.C. 102(e) as being

anticipated by Chilimbi et al. (Chilimbi), U.S. Patent No. 6,330,556.

As per claim 1, Chilimbi discloses a system to optimize cache utilization covering

the steps of:

- **storing a plurality of** data **in a cold partition in a memory** (col. 2 lines 39-43,

"the most heavily referenced (data) ... are kept in a hot (memory location) ... while the

remaining (data) ... are placed in a ... cold (memory location)"),

- **determining whether the** datum **that has been stored in the cold partition**

is hot (col. 2 lines 39-43, "the most heavily referenced (data) ... are kept in a hot

(memory location) ... while the remaining (data) ... are placed in a ... cold (memory

location)"),

- **moving the** data **to a hot partition in the memory when** the datum **has been**

determined to be hot (col. 2 lines 37-43, "The partitioning is based on profile

information about (data) ... access counts ... the most heavily referenced (data are

placed) ... in a hot (memory location) ... while the remaining (data) ... are placed in a ...

cold (memory location)").

As per claim 2, the rejection of claim 1 is incorporated and further, Chilimbi

discloses that **the step of determining whether the** datum **is hot comprises:**

maintaining a different associated counter for each of a plurality of datum **in the**

cold partition of the memory; incrementing or decrementing the count in the associated counter each time its associated data is executed; and concluding the determination that a data is hot if the count in the associated counter reaches a first threshold value (col. 2 lines 37-43, "The partitioning is based on profile information about (data) ... access counts ... the most heavily (executed data) ... are kept in a hot (memory location) ... while the remaining (data) ... are placed in a ... cold (memory location)").

As per claim 3, the rejection of claim 1 is incorporated and further, Chilimbi discloses that the **hot partition is contiguous and disjoint from said cold partition in said memory** (col. 3 lines 65-67, "division of (data) into two (groups) comprising hot access fields and cold access fields", and Fig. 1, item 22, and the associated text (e.g. col. 4 line 5 – col. 5 line 67), describes the computer memory used in this system, which is capable of containing contiguous and disjoint memory sections).

As per claim 4, the rejection of claim 2, is incorporated and further, Chilimbi discloses **maintaining an associated counter step comprises maintaining counters in a data structure external to cache memory** (col. 2 lines 37-39, "The partitioning is based on profile information about (data) ... access counts", and Fig. 1, item 20, and the associated text (e.g. col. 4 line 5 – col. 5 line 67), describes a conventional computer system, which is capable of maintaining counters external to cache memory).

As per claim 5, the rejection of claim 4 is incorporated and further, Chilimbi

discloses **the step of at least temporarily delinking blocks of translations stored in**

said cold partition so that control exits the cache memory in order to perform the

incrementing or decrementing step (col. 2 lines 35-36, "Data structures (blocks) are

partitioned (delinked and accounted for) into heavily referenced and less heavily

references partitions").

As per claim 6, the rejection of claim 2 is incorporated and further, Chilimbi

discloses that **maintaining within said memory an associated counter step**

comprises maintaining one of said associated counters for each entry point into a

plurality of the data **in said cold partition of the memory** (col. 2 lines 37-39, "The

partitioning is based on profile information (maintained in the memory) about (data) ...

access counts").

As per claim 7, the rejection of claim 2 is incorporated and further, Chilimbi

discloses **maintaining an associated counter step comprises logically embedding**

update code on an arc between two data items (abstract lines 1-7, "Nodes in the

graph represent fields (individual data elements), and edges between the nodes are

weighted to indicate field affinity (the number of times that a data item is accessed)").

As per claim 8, the rejection of claim 2 is incorporated and further, Chilimbi

discloses **maintaining an associated counter step comprises maintaining one of**

said associated counters for each item in the hot and cold memory locations **in an associated microprocessor** (col. 2 lines 37-43, "The partitioning is based on profile information about (data) ... access counts ... the most heavily referenced (data) ... are kept in a hot (memory location) ... while the remaining (data) ... are placed in a ... cold (memory location)").

As per claim 9, the rejection of claim 2 is incorporated and further, Chilimbi discloses that the data **moving step comprises sampling a plurality of said associated counters on an intermittent basis to determine if the count therein has reached said threshold value** (col. 2 lines 37-43, "The partitioning is based on profile information about (data) ... access counts (which is sampled on an intermittent basis, then) ... the most heavily (executed data) ... are (placed) in a hot (memory location) ... while the remaining (data) ... are placed in a ... cold (memory location)").

As per claim 10, the rejection of claim 1 is incorporated and further, Chilimbi discloses **determining if a number of hot** data **in said hot partition of said memory exceeds a second threshold value; and if said number of said hot** data exceeds **said second threshold value, then expanding the size of said hot partition in said memory by adding thereto an expansion area contiguous to said hot partition** (col. 2 lines 37-39, "The partitioning is based on profile information about (data) ... access counts", and Fig. 1, item 20, and the associated text (e.g. col. 4 line 5 – col. 5

line 67), describes a conventional computer system, which is capable of creating and

maintaining numerous memory partitions).

As per claim 12, Chilimbi also discloses such claimed limitations as addressed in

claim 2, above.

As per claim 13, this is a system version of the claimed method discussed in

claim 1, above, wherein all claimed limitations also have been addressed above.

As per claims 14-20, Chilimbi also discloses such claimed limitations as

addressed in claims 2-6, 9 and 10, above, respectively.

As per claim 22, Chilimbi also discloses such claimed limitations as addressed in

claim 12, above.

As per claim 23, this is a product version of the claimed method discussed in

claim 1, above, wherein all claimed limitations also have been addressed above and

such a product is deemed to be inherent in the Chilimbi system, otherwise, it would be

inoperative.

8.   Claims 11 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Chilimbi et al. (Chilimbi), U.S. Patent No. 6,330,556 in view of Walls, U.S. Patent

No. 5,675,790.

        As per claim 11, the rejection of claim 10 is incorporated and further Chilimbi

does not explicitly disclose **removing all cold translations from said expansion area**

and storing said removed translations in said cold partition.

        However, Walls, in an analogous environment, discloses **removing all less-**

desirable data entries from a dynamic memory **area and storing said removed** data in

a separate location (col. 8 lines 36-39, "If the segment (data) is smaller than the

minimum size (less-desirable) then remove the segment from the (section of) dynamic

memory ... (and) insert the segment into a separate (location)").

        Therefore, it would have been obvious to a person of ordinary skill in the art, at

the time the invention was made, to incorporate the teachings of Walls into the system

of Chilimbi to enable **removing all cold translations from said expansion area and**

storing said removed translations in said cold partition. The modification would

have been obvious because one of ordinary skill in the art would want to maintain the

temporal access advantages by keeping the less-desirable data items together and

separate from both the most and least desirable data items.

        As per claim 21, the combination of Chilimbi and Walls also discloses such

claimed limitations as addressed in claim 11, above.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Andre R. Fowlkes whose telephone number is (703)305-

8889. The examiner can normally be reached on Monday - Friday, 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Tuan Q. Dam can be reached on (703)305-4552. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

ARF

**WEI Y. ZHEN
PRIMARY PATENT EXAMINER**